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Current Trends

Update: Acquired Immunodeficiency Syndrome (AIDS) in Persons with Hemophilia

Reports of hemophilia-associated acquired immunodeficiency syndrome (AIDS) in the United States were first published in July 1982 (*1*). Since then, the number of U.S. patients with underlying coagulation disorders who develop AIDS has increased each year. In 1981, one U.S. case was reported; in 1982, eight; in 1983, 14; and, as of October 15, 29 cases have been reported in 1984, for a total of 52 cases (Figure 1). Two of these 52 patients had hemophilia B; one, a factor V deficiency; and one, factor VIII deficiency due to her postpartum acquisition of a factor VIII inhibitor. The remaining 48 cases occurred among hemophilia A patients. Three patients are known to have had risk factors for AIDS other than hemophilia. These 52 persons resided in 22 states. Only 10 states have reported more than one case, and no state has reported more than eight cases.

With the exception of one 31-year-old factor V-deficient individual with Kaposi's sarcoma (and without risk factors for AIDS other than his hemophilia), each patient had at least one opportunistic infection suggestive of an underlying cellular immune deficiency. *Pneumocystis carinii* pneumonia has been the most common opportunistic infection, occurring in 44 (85%) of the 52 patients. Other opportunistic infections have included toxoplasmic encephalitis (two cases), disseminated *Mycobacterium avium intracellulare* (one), disseminated cytomegalovirus infection (two), disseminated candidiasis (one), and cryptococcal meningitis (one). Thirty hemophilia patients with AIDS have died; only three of the survivors were diagnosed more than 1 year ago.

CDC has investigated the blood product usage of the majority of these cases. In nine cases, factor VIII concentrates have been the only blood product reportedly used in the 5 years before diagnosis of AIDS. These nine persons had no risk factors for AIDS other than hemophilia. The factor V-deficient patient with Kaposi's sarcoma had not used factor VIII concentrate products but had used large volumes of plasma and factor IX concentrates.

The sera of 22 (42%) of the 52 hemophilia-associated AIDS patients have been tested for antibody to antigens of the AIDS virus using Western blot analysis (*2*). Eighteen (82%) of these specimens contained antibody to one or more antigens (*2,3*). In cooperation with numerous hemophilia treatment centers and physicians, CDC has studied over 200 recipients of factor VIII and 36 recipients of factor IX concentrates containing materials from U.S. donors. Rates of AIDS virus antibody prevalence were 74% for factor VIII recipients and 39% for factor IX recipients (*3,4*). Only prospective evaluation will determine what risk of AIDS exists for seropositive individuals. A recently published study evaluated the thermostability of

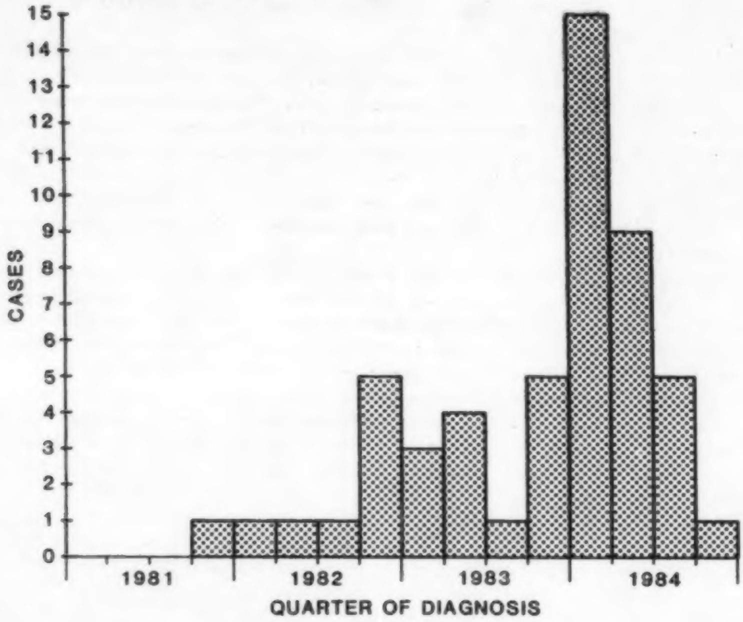
AIDS – Continued

murine retroviruses inocculated into factor concentrates, using a cell transformation assay (*5*). After 48 hours at 68 C (154.4 F), viral titers dropped from 10^8 to two infectious particles/ml. In studies done at CDC, in cooperation with Cutter Laboratories, AIDS virus was added to factor VIII concentrate (virus titer 10^5) and the factor was lyophilized and heated to 68 C (154.4 F). The residual virus titer was determined by an infectivity assay (*6*). Virus was undetectable after 24 hours of heat treatment, the shortest time period examined.

Reported by P Levine, MD, Medical Director, National Hemophilia Foundation, New York City; Div of Host Factors, Center for Infectious Diseases, CDC.

Editorial Note: The possibility of blood or blood products being vehicles for AIDS transmission to hemophilia patients has been supported by the finding of risk of acquisition of AIDS for intravenous drug abusers (*7*) and, subsequently, by reports of transfusion-associated AIDS cases (*8*). The mainstays of therapy for the hemorrhagic phenomena of hemophilia are cryoprecipitate, fresh frozen plasma, and plasma factor preparations; these have been associated with the transmission of several known viral agents, including cytomegalovirus, hepatitis B virus, and the virus(es) of non-A, non-B hepatitis (*9*). While many U.S. hemophilia-associated AIDS patients have received blood products other than factor concentrates in the 5 years preceding their AIDS diagnosis, the occurrence of nine cases with no known risk factor or exposure other than the use of factor VIII preparations implicates these products as potential vehicles of AIDS transmission.

FIGURE 1. Hemophilia-associated acquired immunodeficiency syndrome (AIDS), by quarter — United States, 1981-October 15, 1984



AIDS – Continued

The Medical and Scientific Advisory Council (MASAC) of the National Hemophilia Foundation (NHF) has recently issued revised recommendations for the therapy of hemophilia (*10*). To physicians treating patients with hemophilia, they recommend that (1) cryoprecipitate be used in factor VIII-deficient newborn infants and children under 4 years of age and in newly identified patients never treated with factor VIII concentrates; (2) fresh frozen plasma be used in factor IX-deficient patients in the same categories; and (3) desmopressin (DDAVP) be used whenever possible in patients with mild or moderate hemophilia A. The majority of hemophilia patients do not fit in categories (1) through (3). For these patients, MASAC recommends that, "because heat-treated products appear to have no increase in untoward effects attributable to the heat treatment, treaters using coagulation factor concentrates should strongly consider changing to heat-treated products with the understanding that protection against AIDS is yet to be proven." They also recommend that all elective surgical procedures for hemophilia patients be evaluated with respect to possible advantages and disadvantages of surgical delays.

Although the total number of hemophilia patients who have thus far developed clinical manifestations of AIDS is small relative to other AIDS risk groups, incidence rates for this group are high (3.6 cases/1,000 hemophilia A patients and 0.6/1,000 hemophilia B patients). Continued surveillance is important. Physicians diagnosing opportunistic infections or unusual neoplasms in hemophilia patients who have not received antecedent immunosuppressive therapy are requested to report these findings to local or state health departments and to CDC.

In March 1983, the U.S. Public Health Service recommended that members of groups at increased risk of acquiring AIDS should refrain from donating plasma and/or blood (*11*). A specific serologic test will soon become available for screening purposes, and thus a safer factor concentrate product should result. The preliminary evidence concerning the effects of heat-treatment on the viability of the AIDS virus is strongly supportive of the usefulness of heat-treatment in reducing the potential for transmission of the AIDS virus in factor concentrate products and suggest that the use of nonheat-treated factor concentrates should be limited. CDC and NHF will continue to study the effects of heat-treated factor on the immune status of patients with hemophilia.

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Epidemiologic Notes and Reports

Organophosphate Insecticide Poisoning Among Siblings — Mississippi

On August 6, 1984, the Mississippi State Department of Health was informed of the death of an 11-year-old girl from Tunica County, Mississippi, and the hospitalization of her six siblings. The initial clinical diagnosis for the seven children was organophosphate poisoning. Neither the children's mother nor her live-in male companion was ill. Following is a summary of the State Department of Health's investigation.

On August 2, five of the seven children had visited a local physician complaining of abdominal pain of 2 days' duration. One child also had fever and diarrhea. The physician diagnosed viral gastroenteritis and suggested fluids and rest. There was no improvement during the next day, and on the morning of August 4, three children did not respond to vocal sounds, and the others were obviously ill.

Later that day, all seven children presented to a Memphis, Tennessee, hospital with signs and symptoms of organophosphate poisoning. Two were in respiratory arrest, and the other five had various degrees of lethargy, increased salivation, increased respiratory secretions, and pinpoint pupils. All the children had depressed serum and erythrocyte cholinesterase levels (Table 1). One child could not be resuscitated and died. Preliminary autopsy findings were consistent with organophosphate poisoning and suggested ingestion as a primary route of exposure. A second child died August 9, and the other five children recovered and were discharged. A survey of local physicians and emergency rooms revealed no other similar cases.

Because both adults in the household and a nearby adult neighbor were clinically well, it was felt that the source of poisoning was confined to the children's household. The male live-in companion reported having sprayed the inside of the house July 26 with a solution of insecticide in an attempt to control spiders. He had obtained a nearly empty insecticide container

TABLE 1. Concentrations of plasma cholinesterese (ChE), red blood cell (RBC) ChE, and urinary paranitrophenols (PNP)* in children and adults — Mississippi, 1984

Group	Age (years)	Gender	Plasma ChE (normal 2450-4850 mU per min per ml)	RBC ChE (normal 0.57-0.98 △ pH/hr)	Urinary PNP (normal 0 ppm)
Children†	11	F§	¶	¶	¶
	9	M	1,023	0.15	31.7
	8	M	987	0.10	11.8
	6	F	1,707	0.10	¶
	5	F	964	0.10	¶
	4	F§	914	0.00	1.2
	2	F	1,534	0.10	¶
Adults**	27	F	2,017	0.6	6.5
	33	M	3,766	0.5	12.7
	75	F	3,408	0.7	0.46

*An excretory product of organophosphate compounds.

†Children's samples taken August 4, and adults' samples taken August 8.

§Deceased.

¶Not available.

**Mother, companion, neighbor, respectively.

Insecticide Poisoning – Continued

from the farm where he worked and had added water to it. He reported using a hand sprayer to spray the solution on the inside upper walls of three of the four rooms (excluding the kitchen) in the house. He reported no subsequent spraying, but the sprayer, still partly filled, was found on the back porch of the house the day after the children became ill. The house had no running water, and drinking water was obtained from the nearby neighbor's well and stored in an open ice chest. Therefore, contamination of the drinking water was considered a strong possibility for exposure.

Samples of insecticide solution from the sprayer, water, prepared food, other liquids, and indoor and outdoor air were obtained (Table 2). The sprayer solution contained the organophosphate insecticide methyl parathion $[(CH_3O)_2\text{-PS-O-}C_6H_3(NO_2)Cl]$ in a concentration nearly three times that used for outdoor agricultural spraying. The drinking water in the house contained methyl parathion in a concentration above the suggested no adverse response level (SNARL); water from the well was negative for methyl parathion. The air inside the house contained over 100 times the concentration of methyl parathion measured in the air in the same locality during the spraying season (*2*); the air on the porch contained only one-seventh the amount found inside.

Food histories showed that, since the visit to the doctor August 2, the children had eaten primarily canned soups cooked with water and drunk liquids prepared with the household drinking water. In contrast, the adults apparently ate other foods (e.g., catfish) and drank more bottled soda. Samples of blood and urine from the adults were analyzed for evidence of exposure to organophosphate compounds and compared with those of the children (Table 1). The higher levels of exposure among the children are evident, although the adults were sampled several days later.

It seems likely that the seven siblings were exposed to methyl parathion by multiple routes, primarily ingestion, inhalation, and possibly surface contact via contaminated clothing.

TABLE 2. Concentration of methyl parathion in samples — Mississippi, 1984

Sample	Concentration
Spray can solution (tested August 7)	4 [illegible]*
Water (tested August 7)	
Neighbor's well water	0†
Open cooler	138 ppb†
Jar in bedroom	275 ppb†
Food (tested August 7)	
Orange drink mix	35 ppb
Soup	pending
Peaches	pending
Air (tested August 8)	
Children's bedroom	41 $\mu g\ m^3$§
Front porch	6 $\mu g\ m^3$§
Clothing (tested August 13)	pending

*Manufacturer's recommended field concentration is 1.25 [illegible].

†SNARL is 43 ppb (*1*).

§SNARL not established; typical ambient air values from a similar area in Mississippi were 200-400 $\mu g/m^3$ (*2*).

Insecticide Poisoning – Continued

The absence of clinical illness in the two adults in the household may reflect lower levels of exposure due in part to different food intake. The 8-day delay between the reported spraying and the manifestation of classic symptoms of organophosphate poisoning is not explained. Efforts are under way to decontaminate the house and to reemphasize to the public the danger of organophosphate insecticides used inappropriately.

Reported by A Dean, J Pugh, Tunica County Health Dept, K Embrey, District I Health Office, J Cain, MS, L Lane, PhD, Mississippi State Chemical Laboratory, B Brackin, MPH, FE Thompson, Jr, MD, State Epidemiologist, Mississippi State Dept of Health; Div of Field Svcs, Epidemiology Program Office, CDC.

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TABLE I. Summary—cases of specified notifiable diseases, United States

Disease	42nd Week Ending			Cumulative, 42nd Week Ending		
	Oct. 20, 1984	Oct. 22, 1983	Median 1979-1983	Oct. 20, 1984	Oct. 22, 1983	Median 1979-1983
Acquired Immunodeficiency Syndrome (AIDS)*	99	60	N	3,353	1,581	N
Aseptic meningitis	281	376	295	6,304	10,235	7,454
Encephalitis: Primary (arthropod-borne & unspec.)	47	60	40	903	1,524	1,240
Post-infectious	-	1	2	79	77	77
Gonorrhea: Civilian	20,609	19,503	19,846	674,232	727,998	805,988
Military	328	530	501	16,844	19,736	22,390
Hepatitis: Type A	545	468	484	17,128	16,917	20,281
Type B	597	469	434	20,701	19,196	16,429
Non A, Non B	94	72	N	2,967	2,741	N
Unspecified	186	185	191	4,610	5,912	8,309
Legionellosis	12	17	N	524	574	N
Leprosy	4	5	5	186	200	171
Malaria	21	11	27	762	668	889
Measles: Total**	13	28	38	2,377	1,330	2,711
Indigenous	13	10	N	2,105	1,074	N
Imported	-	18	N	272	256	N
Meningococcal infections: Total	39	38	39	2,200	2,220	2,220
Civilian	39	38	39	2,195	2,205	2,205
Military	-	-	-	5	15	15
Mumps	51	56	78	2,415	2,679	4,515
Pertussis	43	50	36	1,848	1,974	1,281
Rubella (German measles)	14	6	29	659	819	2,094
Syphilis (Primary & Secondary): Civilian	589	717	694	22,407	26,148	24,874
Military	4	8	7	247	326	316
Toxic Shock syndrome	7	3	N	390	350	N
Tuberculosis	457	449	520	17,266	18,826	21,740
Tularemia	4	1	3	261	240	214
Typhoid fever	21	34	17	287	385	420
Typhus fever, tick-borne (RMSF)	13	9	8	783	1,050	1,050
Rabies, animal	125	107	107	4,395	5,083	5,170

TAPLE II. Notifiable diseases of low frequency, United States

	Cum. 1984		Cum. 1984
Anthrax	1	Plague (Colo. 1)	27
Botulism: Foodborne (Wash. 1)	14	Poliomyelitis: Total	3
Infant (Calif. 3)	74	Paralytic	3
Other	6	Psittacosis	72
Brucellosis (Mo. 1, Tex. 1, Calif. 1)	97	Rabies, human	2
Cholera	-	Tetanus (Ark. 1)	48
Congenital rubella syndrome (Oreg. 1)	4	Trichinosis (Tex. 1)	62
Diphtheria	1	Typhus fever, flea-borne (endemic, murine) (Tex. 1)	23
Leptospirosis (Upstate N.Y. 1)	26		

*The 1983 reports which appear in this table were collected before AIDS became a notifiabl~ condition.

**There were no cases of internationally imported measles for this week.

TABLE III. Cases of specified notifiable diseases, United States, weeks ending October 20, 1984 and October 22, 1983 (42nd Week)

Reporting Area	AIDS	Aseptic Menin-gitis	Encephalitis		Gonorrhea (Civilian)		Hepatitis (Viral), by type				Legionel-losis	Leprosy
			Primary	Post-in-fectious			A	B	NA,NB	Unspeci-fied		
	Cum. 1984	1984	Cum. 1984	Cum. 1984	Cum. 1984	Cum. 1983	1984	1984	1984	1984	1984	Cum. 1984
UNITED STATES	3,353	281	903	79	674,232	727,998	545	597	94	188	12	186
NEW ENGLAND	105	23	40	2	18,950	18,694	13	45	5	23	-	9
Maine	-	-	-	-	798	912	-	-	-	-	-	-
N.H.	1	3	7	-	571	601	1	7	-	-	-	-
Vt.	-	5	4	-	302	365	-	2	-	-	-	-
Mass.	59	6	18	-	8,021	7,939	10	28	-	23	-	6
R.I.	6	2	-	-	1,305	1,034	-	-	-	-	-	3
Conn.	39	7	11	2	7,953	7,843	2	8	5	-	-	-
MID ATLANTIC	1,466	47	114	10	90,854	91,907	61	104	7	12	2	36
Upstate N.Y.	133	36	38	7	14,412	15,214	14	23	2	5	-	3
N.Y. City	1,063	2	11	-	35,953	36,238	17	49	-	3	-	31
N.J.	191	-	26	-	15,848	16,982	15	22	2	4	2	-
Pa.	79	9	39	3	24,641	23,473	15	10	3	-	-	2
E.N. CENTRAL	150	44	249	18	95,534	106,371	20	46	3	4	4	6
Ohio	16	16	74	9	25,107	27,699	9	14	-	1	1	2
Ind.	22	10	67	-	10,277	10,454	2	3	1	1	1	-
Ill.	78	-	27	6	21,551	30,827	2	-	-	-	-	2
Mich.	24	18	52	-	27,969	28,080	7	29	2	2	2	2
Wis.	10	-	29	3	10,630	9,311	-	-	-	-	-	-
W.N. CENTRAL	34	11	78	3	33,188	34,639	14	17	3	-	-	2
Minn.	9	4	34	-	5,032	4,745	4	1	2	-	-	1
Iowa	2	1	29	-	3,647	3,730	2	1	-	-	-	1
Mo.	19	3	8	-	15,828	17,073	3	12	-	-	-	-
N. Dak.	-	-	-	-	322	371	-	-	-	-	-	-
S. Dak.	-	-	1	1	789	878	3	-	-	-	-	-
Nebr.	2	-	1	-	2,388	2,236	2	2	-	-	-	-
Kans.	2	3	5	2	5,182	5,606	-	1	1	-	-	-
S. ATLANTIC	469	34	131	16	168,986	187,270	26	101	16	8	4	8
Del.	5	-	1	-	3,166	3,441	-	-	-	-	1	-
Md.	39	4	27	-	19,944	24,024	-	10	1	1	-	1
D.C.	70	-	-	-	12,307	12,896	1	-	-	-	-	1
Va.	30	9	27	5	16,441	17,209	4	15	4	-	1	4
W. Va.	4	1	24	-	2,153	2,096	3	-	-	-	-	-
N.C.	11	2	22	7	27,953	29,059	1	4	-	-	-	-
S.C.	7	2	4	-	17,434	17,467	1	19	3	2	2	-
Ga.	46	12	2	2	28,722	37,079	5	19	-	-	-	1
Fla.	257	4	24	2	40,866	43,999	11	34	8	5	-	1
E.S. CENTRAL	22	28	46	7	60,436	61,105	14	44	2	1	-	-
Ky.	9	5	9	-	7,293	7,170	8	5	-	-	-	-
Tenn.	6	10	15	1	24,652	25,198	4	19	-	1	-	-
Ala.	5	8	19	5	18,797	18,822	1	14	2	-	-	-
Miss.	2	5	3	1	9,694	9,915	1	6	-	-	-	-
W.S. CENTRAL	243	32	83	4	91,655	102,474	91	68	7	71	-	17
Ark.	1	1	-	2	8,149	8,010	2	2	-	3	-	1
La.	38	4	8	-	20,369	19,574	10	14	-	2	-	1
Okla.	8	1	19	1	10,102	11,894	13	9	-	2	-	-
Tex.	198	26	56	1	53,035	62,996	66	43	7	64	-	15
MOUNTAIN	55	2	25	10	22,225	23,110	52	40	5	18	-	8
Mont.	-	-	2	-	891	959	5	1	-	-	-	-
Idaho	-	-	-	-	1,084	1,031	-	-	-	-	-	-
Wyo.	1	-	-	-	611	617	1	-	1	-	-	-
Colo.	29	1	7	-	6,339	6,465	5	1	-	6	-	-
N. Mex.	1	-	-	-	2,696	2,814	10	10	-	-	-	-
Ariz.	11	-	9	3	6,023	6,566	15	14	2	6	-	6
Utah	7	-	7	7	1,052	1,107	4	5	1	1	-	1
Nev.	6	1	-	-	3,529	3,551	12	9	1	5	-	1
PACIFIC	809	60	137	9	92,404	102,428	254	132	46	49	2	100
Wash.	43	2	7	-	6,694	8,011	19	5	6	1	-	3
Oreg.	7	-	-	-	5,357	5,462	20	8	-	-	-	1
Calif.	746	49	127	9	76,548	84,344	215	118	39	48	2	81
Alaska	1	-	-	-	2,253	2,647	-	1	-	-	-	-
Hawaii	12	9	3	-	1,552	1,964	-	-	1	-	-	15
Guam	-	U	-	-	95	114	U	U	U	U	U	-
P.R.	48	5	3	2	2,709	2,311	10	-	-	3	-	4
V.I.	-	U	-	-	365	229	U	U	U	U	U	-
Pac. Trust Terr.	-	U	-	-	-	-	U	U	U	U	U	-

N: Not notifiable U: Unavailable

TABLE III. (Cont'd.) Cases of specified notifiable diseases, United States, weeks ending October 20, 1984 and October 22, 1983 (42nd Week)

Reporting Area	Malaria	Measles (Rubeola)					Menin-gococcal Infections	Mumps		Pertussis			Rubella		
		Indigenous		Imported *		Total									
	Cum. 1984	1984	Cum. 1984	1984	Cum. 1984	Cum. 1983	Cum. 1984	1984	Cum. 1984	1984	Cum. 1984	Cum. 1983	1984	Cum. 1984	Cum. 1983
UNITED STATES	762	13	2,105	-	272	1,330	2,200	51	2,415	43	1,848	1,974	14	659	819
NEW ENGLAND	45	1	94	-	12	18	146	5	80	1	54	61	-	20	15
Maine	-	-	-	-	-	-	1	3	26	-	2	4	-	1	-
N.H.	-	-	33	-	3	3	7	-	15	-	8	9	-	1	4
Vt.	6	-	2	-	5	-	26	-	5	-	23	8	-	-	5
Mass.	25	1	49	-	-	6	63	2	15	1	14	34	-	18	6
R.I.	4	-	-	-	-	-	12	-	10	-	3	5	-	-	-
Conn.	10	-	10	-	4	9	37	-	9	-	4	1	-	-	-
MID ATLANTIC	122	1	118	-	39	112	374	6	282	7	162	339	2	221	137
Upstate N.Y.	25	-	24	-	12	13	121	5	83	7	97	107	-	99	28
N.Y. City	37	1	90	-	17	69	78	1	24	-	7	55	2	101	86
N.J.	34	-	4	-	3	27	71	-	132	-	11	19	-	17	3
Pa.	26	-	-	-	7	3	104	-	43	-	47	158	-	4	20
E.N. CENTRAL	71	-	615	-	74	681	355	6	942	1	415	445	2	87	120
Ohio	16	-	3	-	6	87	119	-	452	1	70	136	-	2	2
Ind.	2	-	2	-	1	406	45	-	59	-	229	53	-	5	23
Ill.	25	-	177	-	1	180	78	2	177	-	25	149	2	52	51
Mich.	15	-	411	-	54	7	68	4	171	-	28	37	-	20	16
Wis.	13	-	22	-	12	1	45	-	83	-	63	70	-	8	28
W.N. CENTRAL	21	9	48	-	8	8	135	3	101	3	117	123	2	39	39
Minn.	7	9	44	-	3	1	28	-	6	1	15	41	-	4	8
Iowa	2	-	-	-	-	-	22	1	23	-	10	6	-	1	-
Mo.	6	-	4	-	-	1	42	-	10	2	20	22	-	-	-
N. Dak.	1	-	-	-	-	-	1	-	2	-	-	2	-	3	-
S. Dak.	1	-	-	-	-	-	6	-	-	-	9	8	-	-	-
Nebr.	2	-	-	-	-	-	11	-	4	-	11	2	-	-	-
Kans.	2	-	-	-	5	6	25	2	56	-	52	42	2	31	31
S. ATLANTIC	111	-	18	-	32	205	461	6	178	7	144	238	1	23	95
Del.	4	-	-	-	-	-	4	-	2	-	2	5	-	-	-
Md.	28	-	8	-	14	10	37	-	37	-	13	29	-	1	3
D.C.	1	-	-	-	5	-	8	-	-	-	-	-	-	-	-
Va.	28	-	1	-	4	23	53	-	17	-	15	50	-	-	2
W. Va.	1	-	-	-	-	-	5	2	38	-	11	9	-	-	-
N.C.	9	-	-	-	-	1	74	-	17	-	32	27	-	-	10
S.C.	2	-	-	-	-	4	53	-	4	-	1	13	-	-	1
Ga.	13	-	-	-	1	8	84	4	21	3	13	65	-	2	13
Fla.	25	-	9	-	8	159	143	-	42	4	57	40	1	20	66
E.S. CENTRAL	9	-	4	-	2	6	127	4	52	-	14	31	2	20	16
Ky.	1	-	1	-	-	1	49	1	11	-	2	13	2	14	15
Tenn.	2	-	-	-	2	-	31	1	17	-	7	7	-	-	-
Ala.	6	-	3	-	-	5	32	-	6	-	1	5	-	3	1
Miss.	-	-	-	-	-	-	15	2	18	-	4	6	-	3	-
W.S. CENTRAL	72	-	530	-	25	74	232	4	135	9	292	404	-	61	108
Ark.	-	-	8	-	-	13	35	-	7	-	15	20	-	3	-
La.	9	-	8	-	-	25	47	-	-	-	8	9	-	-	10
Okla.	9	-	-	-	8	1	24	N	N	2	236	297	-	-	-
Tex.	54	-	514	-	17	35	126	4	128	7	33	78	-	58	98
MOUNTAIN	24	-	113	-	32	17	73	4	225	1	111	214	-	21	30
Mont.	1	-	-	-	-	3	2	-	7	-	19	1	-	-	3
Idaho	2	-	-	-	23	10	8	-	9	-	7	16	-	1	8
Wyo.	-	-	-	-	-	1	3	-	2	-	6	6	-	2	4
Colo.	6	-	-	-	6	2	26	2	21	1	39	132	-	2	1
N. Mex.	1	-	88	-	-	-	7	N	N	-	8	13	-	1	-
Ariz.	9	-	-	-	1	1	15	2	171	-	23	22	-	4	6
Utah	5	-	25	-	2	-	7	-	11	-	7	24	-	7	7
Nev.	-	-	-	-	-	-	5	-	4	-	2	-	-	4	1
PACIFIC	287	2	565	-	48	200	297	13	420	14	539	119	5	187	259
Wash.	12	-	125	-	14	18	47	1	46	5	304	16	-	1	9
Oreg.	10	-	-	-	-	10	43	N	N	3	28	8	-	2	13
Calif.	261	2	281	-	30	178	199	10	341	5	132	88	4	158	235
Alaska	-	-	-	-	-	2	7	2	11	-	-	4	-	1	1
Hawaii	4	-	159	-	4	1	1	-	22	1	75	3	1	5	1
Guam	1	U	83	U	2	2	1	U	5	U	-	-	U	2	-
P.R.	4	-	1	-	-	94	4	9	162	-	1	13	1	14	5
V.I.	-	U	-	U	-	5	-	U	5	U	-	-	U	-	2
Pac. Trust Terr.	-	U	-	U	-	-	-	U	-	U	-	-	U	-	-

*For measles only, imported cases includes both out-of-state and international importations.

N: Not notifiable U: Unavailable †International §Out-of-state

TABLE III. (Cont'd.) Cases of specified notifiable diseases, United States, weeks ending October 20, 1984 and October 22, 1983 (42nd Week)

Reporting Area	Syphilis (Civilian) (Primary & Secondary)		Toxic-shock Syndrome	Tuberculosis		Tula-remia	Typhoid Fever	Typhus Fever (Tick-borne) (RMSF)	Rabies, Animal
	Cum. 1984	Cum. 1983	1984	Cum. 1984	Cum. 1983	Cum. 1984	Cum. 1984	Cum. 1984	Cum. 1984
UNITED STATES	22,407	26,148	7	17,266	18,826	261	287	783	4,395
NEW ENGLAND	432	555	-	522	559	7	16	5	46
Maine	7	18	-	21	31	-	-	-	12
N.H.	12	19	-	25	31	-	-	-	16
Vt.	1	2	-	9	7	-	-	-	-
Mass.	249	353	-	290	294	7	13	4	10
R.I.	16	17	-	44	49	-	-	-	-
Conn.	147	146	-	133	147	-	3	1	8
MID ATLANTIC	3,019	3,428	-	3,123	3,352	1	48	23	412
Upstate N.Y.	232	314	-	511	529	-	12	8	84
N.Y. City	1,877	2,002	-	1,260	1,332	1	14	2	-
N.J.	528	656	-	700	721	-	16	3	30
Pa.	382	456	-	652	770	-	6	10	298
E.N. CENTRAL	1,072	1,396	3	2,251	2,522	8	48	55	194
Ohio	199	373	2	404	395	-	6	36	24
Ind.	110	95	-	261	280	-	8	6	21
Ill.	384	661	1	943	1,110	8	20	10	70
Mich.	314	195	-	502	607	-	7	3	21
Wis.	65	72	-	141	130	-	7	-	58
W.N. CENTRAL	307	324	-	520	614	79	10	48	635
Minn.	81	123	-	85	130	1	3	1	71
Iowa	11	21	-	55	58	-	-	6	131
Mo.	153	117	-	256	309	41	5	14	58
N. Dak.	9	2	-	11	6	-	-	-	124
S. Dak.	-	11	-	21	35	34	-	5	163
Nebr.	14	15	-	29	20	-	-	4	40
Kans.	39	35	-	63	56	3	2	18	48
S. ATLANTIC	6,528	7,004	-	3,646	3,759	8	31	372	1,302
Del.	26	31	-	50	53	-	-	1	7
Md.	405	425	-	364	291	-	3	29	725
D.C.	262	302	-	144	158	1	6	-	-
Va.	346	483	-	376	396	1	8	51	185
W. Va.	15	22	-	112	114	-	-	7	38
N.C.	675	688	-	529	572	1	1	158	24
S.C.	629	437	-	429	353	-	1	78	53
Ga.	1,059	1,245	-	564	656	4	1	45	163
Fla.	3,111	3,371	-	1,078	1,166	1	12	3	107
E.S. CENTRAL	1,587	1,804	-	1,626	1,686	6	8	84	212
Ky.	85	144	-	376	424	-	2	16	49
Tenn.	404	484	-	466	505	5	2	43	71
Ala.	532	703	-	486	437	-	2	15	92
Miss.	566	473	-	298	320	1	2	10	-
W.S. CENTRAL	5,510	6,750	3	2,018	2,294	110	17	180	878
Ark.	160	159	-	223	272	79	-	30	98
La.	987	1,372	-	275	356	7	1	3	51
Okla.	175	163	1	192	209	19	3	118	90
Tex.	4,188	5,056	2	1,328	1,457	5	13	29	639
MOUNTAIN	497	553	-	458	523	32	12	12	247
Mont.	3	7	-	17	42	3	1	8	107
Idaho	21	7	-	27	27	7	-	1	9
Wyo.	4	10	-	1	12	1	-	3	18
Colo.	138	130	-	55	75	6	4	-	39
N. Mex.	66	150	-	89	95	2	3	-	11
Ariz.	169	141	-	213	201	4	3	-	42
Utah	18	20	-	32	37	4	-	-	5
Nev.	78	88	-	24	34	5	1	-	16
PACIFIC	3,455	4,334	1	3,102	3,517	10	97	4	469
Wash.	120	159	-	156	197	2	3	-	3
Oreg.	96	116	-	126	149	2	2	1	1
Calif.	3,171	3,984	1	2,591	2,917	6	87	2	457
Alaska	5	12	-	52	62	-	1	1	8
Hawaii	63	63	-	177	192	-	4	-	-
Guam	-	-	U	5	5	-	-	-	-
P.R.	649	794	-	293	385	-	3	-	58
V.I.	8	17	U	3	2	-	3	-	-
Pac. Trust Terr.	-	-	U	-	-	-	-	-	-

U: Unavailable

TABLE IV. Deaths in 121 U.S. cities,* week ending October 20, 1984 (42nd Week Ending)

Reporting Area	All Causes, By Age (Years)						P&I** Total
	All Ages	≥65	45-64	25-44	1-24	<1	
NEW ENGLAND	698	465	167	32	15	19	39
Boston, Mass.	187	113	47	15	5	7	15
Bridgeport, Conn.	44	35	8	-	-	1	1
Cambridge, Mass.	27	19	8	-	-	-	1
Fall River, Mass.	30	20	7	2	1	-	1
Hartford, Conn.	46	26	16	1	1	2	-
Lowell, Mass.	23	17	4	1	1	-	1
Lynn, Mass.	22	17	4	-	1	-	-
New Bedford, Mass.	25	18	6	1	-	-	1
New Haven, Conn.	62	40	12	3	3	4	1
Providence, R.I.	71	44	22	2	2	1	4
Somerville, Mass.	7	5	2	-	-	-	1
Springfield, Mass.	39	28	7	3	-	1	4
Waterbury, Conn.	34	28	4	1	1	-	2
Worcester, Mass.	81	55	20	3	-	3	7
MID. ATLANTIC	2,588	1,708	542	200	51	86	116
Albany, N.Y.	53	31	13	4	2	3	2
Allentown, Pa.	20	16	4	-	-	-	-
Buffalo, N.Y.	118	89	25	-	2	2	12
Camden, N.J.	35	23	9	2	1	-	2
Elizabeth, N.J.	28	18	7	2	1	-	1
Erie, Pa.†	38	30	7	-	1	-	1
Jersey City, N.J.	38	22	6	6	1	3	-
N.Y. City, N.Y.	1,429	906	305	137	31	50	53
Newark, N.J.	54	31	9	8	2	4	4
Paterson, N.J.	35	19	10	3	-	3	2
Philadelphia, Pa.†	300	187	71	26	4	10	10
Pittsburgh, Pa.†	69	47	17	1	2	2	2
Reading, Pa.	37	33	4	-	-	-	3
Rochester, N.Y.	119	93	15	4	2	5	11
Schenectady, N.Y.	34	27	7	-	-	-	1
Scranton, Pa.†	30	26	4	-	-	-	7
Syracuse, N.Y.	60	41	14	2	1	2	1
Trenton, N.J.	30	23	4	2	-	1	2
Utica, N.Y.	25	20	4	1	-	-	-
Yonkers, N.Y.	36	26	7	2	1	-	2
E.N. CENTRAL	2,140	1,498	392	101	67	73	82
Akron, Ohio	56	42	8	3	2	1	-
Canton, Ohio	32	22	6	1	2	1	1
Chicago, Ill. §	441	383	5	13	13	18	13
Cincinnati, Ohio	161	103	36	14	3	5	15
Cleveland, Ohio	172	96	50	10	9	7	-
Columbus, Ohio	125	74	31	8	4	8	3
Dayton, Ohio	118	80	32	2	2	2	4
Detroit, Mich.	258	154	66	22	10	6	8
Evansville, Ind.	42	29	10	1	-	2	3
Fort Wayne, Ind.	46	33	11	-	1	1	1
Gary, Ind.	17	6	7	1	1	2	1
Grand Rapids, Mich.	56	35	10	4	4	3	2
Indianapolis, Ind.	151	102	29	7	7	6	2
Madison, Wis.	37	28	4	2	1	2	5
Milwaukee, Wis.	119	86	28	1	1	3	7
Peoria, Ill.	49	29	10	3	4	3	4
Rockford, Ill.	36	29	4	1	-	2	4
South Bend, Ind.	53	45	7	1	-	-	3
Toledo, Ohio	116	76	31	6	2	1	4
Youngstown, Ohio	55	46	7	1	1	-	2
W.N. CENTRAL	676	449	151	35	23	18	22
Des Moines, Iowa	62	42	14	3	2	1	2
Duluth, Minn.	29	21	5	1	1	1	2
Kansas City, Kans.	38	24	10	1	1	2	-
Kansas City, Mo.	78	55	12	2	4	5	2
Lincoln, Nebr.	31	21	7	-	1	2	3
Minneapolis, Minn.	84	58	19	4	3	-	-
Omaha, Nebr.	78	51	21	5	1	-	2
St. Louis, Mo.	138	94	29	10	2	3	5
St. Paul, Minn.	79	47	15	8	5	4	-
Wichita, Kans.	59	36	19	1	3	-	6
S. ATLANTIC	1,305	827	283	101	50	44	54
Atlanta, Ga.	152	93	34	11	7	7	4
Baltimore, Md.	285	168	66	21	12	18	5
Charlotte, N.C.	88	46	27	9	6	-	8
Jacksonville, Fla.	126	94	16	7	7	2	7
Miami, Fla.	126	82	28	12	3	1	1
Norfolk, Va.	53	24	19	5	1	4	4
Richmond, Va.	80	47	18	8	3	4	5
Savannah, Ga.	33	22	7	1	1	2	1
St. Petersburg, Fla.	105	93	7	2	1	2	3
Tampa, Fla.	62	46	5	7	3	1	9
Washington, D.C.	130	71	39	13	5	2	6
Wilmington, Del.	65	41	17	5	1	1	1
E.S. CENTRAL	745	480	180	43	19	23	45
Birmingham, Ala.	106	71	19	8	5	3	1
Chattanooga, Tenn.	54	35	15	-	4	-	7
Knoxville, Tenn.	70	55	11	4	-	-	4
Louisville, Ky.	125	82	32	9	-	2	6
Memphis, Tenn.	163	101	42	13	1	6	14
Mobile, Ala.	59	35	17	3	2	2	4
Montgomery, Ala.	34	15	12	2	1	4	1
Nashville, Tenn.	134	86	32	4	6	6	8
W.S. CENTRAL	1,249	732	278	111	67	61	39
Austin, Tex.	47	30	6	4	6	1	5
Baton Rouge, La.	47	26	16	1	3	1	4
Corpus Christi, Tex.	41	28	9	-	1	3	-
Dallas, Tex.	170	99	33	16	13	9	4
El Paso, Tex.	61	36	9	7	3	6	3
Fort Worth, Tex.	102	60	18	15	4	5	5
Houston, Tex.	329	156	88	42	21	22	5
Little Rock, Ark.	58	37	10	7	2	2	1
New Orleans, La.	111	67	31	5	5	3	1
San Antonio, Tex.	131	83	31	8	6	3	3
Shreveport, La.	52	38	11	1	2	-	1
Tulsa, Okla.	100	72	16	5	1	6	7
MOUNTAIN	667	429	150	48	21	18	34
Albuquerque, N.Mex.	96	60	23	9	1	2	2
Colo. Springs, Colo.	32	20	5	5	1	1	3
Denver, Colo.	120	79	24	11	2	4	7
Las Vegas, Nev.	59	32	17	5	4	1	6
Ogden, Utah	32	25	2	1	2	2	2
Phoenix, Ariz.	155	96	43	7	6	3	1
Pueblo, Colo.	22	18	2	-	2	-	4
Salt Lake City, Utah	45	27	9	6	1	2	-
Tucson, Ariz.	106	72	25	4	2	3	9
PACIFIC	1,722	1,127	354	120	58	56	90
Berkeley, Calif.	16	10	3	2	-	1	1
Fresno, Calif.	81	49	15	5	4	8	4
Glendale, Calif.	14	11	3	-	-	-	1
Honolulu, Hawaii	81	56	16	6	2	1	7
Long Beach, Calif.	90	59	22	3	2	4	1
Los Angeles, Calif.	395	285	68	23	12	1	16
Oakland, Calif.	63	41	13	2	2	5	4
Pasadena, Calif.	33	27	2	1	2	1	4
Portland, Oreg.	118	82	20	6	4	6	3
Sacramento, Calif.	168	106	38	13	6	5	6
San Diego, Calif.	144	81	36	12	9	6	13
San Francisco, Calif.	158	87	34	22	8	7	8
San Jose, Calif.	146	92	34	13	3	3	14
Seattle, Wash.	127	76	34	10	3	4	1
Spokane, Wash.	53	37	9	2	1	4	5
Tacoma, Wash.	35	28	7	-	-	-	2
TOTAL	11,790††	7,715	2,497	791	371	397	521

* Mortality data in this table are voluntarily reported from 121 cities in the United States, most of which have populations of 100,000 or more. A death is reported by the place of its occurrence and by the week that the death certificate was filed. Fetal deaths are not included.

** Pneumonia and influenza

† Because of changes in reporting methods in these 4 Pennsylvania cities, these numbers are partial counts for the current week. Complete counts will be available in 4 to 6 weeks.

†† Total includes unknown ages.

§ Data not available. Figures are estimates based on average of past 4 weeks.

Cryptosporidiosis among Children Attending Day-Care Centers — Georgia, Pennsylvania, Michigan, California, New Mexico

During 1984, CDC has received several reports of cryptosporidiosis among children attending day-care centers. Seven investigations conducted in five states are summarized below.

Georgia: *Investigation 1:* Two sisters, aged 2 years and 4 years, who attended an Atlanta day-care center, developed watery diarrhea in late February, and stool specimens showed *Cryptosporidium* oocysts. An investigation in April found that 27 (51%) of 53 persons had recent histories of diarrhea. Stool examinations of 50 children and 11 adult staff members revealed three other children with *Cryptosporidium*; all had recent histories of afebrile, diarrheal illness without nausea or vomiting. No asymptomatic children had cryptosporidiosis. One infected child also had *Giardia lamblia* cysts. Eight of 27 symptomatic and six of 26 asymptomatic persons had *Giardia*. Symptomatic persons had mild-to-moderate diarrhea, and most sought medical attention. No one was hospitalized.

Investigation 2: On August 27, a 2-year-old day-care center attendee in Atlanta developed severe, watery diarrhea. Stool examination on September 6 showed *Cryptosporidium*. Thus far, four (17%) of 23 children from the same room who were examined have had *Cryptosporidium*. Two of 12 children tested in other rooms at the day-care center had *Cryptosporidium*; both children were siblings of infected children in the original room. Two of the six infected children had no histories of diarrhea and were asypmtomatic at the time of the investigation; the others had mild-to-moderate diarrhea without fever. None required hospitalization, and two children were seen by physicians.

Pennsylvania: Beginning in June, the rate of diarrheal illness increased at a day-care center in Philadelphia, where 20 (34%) of 59 children were symptomatic. Stool specimens obtained from 45 children were examined for enteropathogenic bacteria, viruses, and parasites. Eleven (65%) of 17 symptomatic children and three (11%) of 28 asymptomatic children had *Cryptosporidium*. Enteropathogenic bacteria and viruses were not implicated in the outbreak (*1*).

Michigan: In September, an investigation of day-care-center-associated diarrhea in Ann Arbor found a 2-year-old with cryptosporidiosis. Review of the day-care center's records showed an increase of diarrhea among children from three rooms—two for toddler-aged children, and one for infants. Stool specimens were obtained from 38 (70%) of the 54 children in the three affected rooms and examined for parasites, *Salmonella, Shigella, Campylobacter*, and rotavirus; 21 (55%) had *Cryptosporidium*. One of these children also had *Salmonella*; another also had *Giardia*. Infected children generally had mild-to-moderate diarrhea without fever; none required hospitalization, and three children saw physicians.

California: On September 14, a 2-year-old child with a diarrheal illness who regularly attends a day-care center in San Carlos was found to have cryptosporidiosis. A survey showed that children with recent histories of diarrhea were limited to the classroom with the index child, where 10 of 11 classmates had been symptomatic. Stool specimens from all 11 children were examined for *Salmonella, Shigella, Campylobacter, Yersinia, Vibrio, Aeromonas, Edwardsiella, Plesiomonas*, and parasites. Six of 10 specimens from symptomatic children were positive for *Cryptosporidium*. *Yersinia enterocolitica* serotype 5,27 was recovered from one currently asymptomatic child who had symptoms earlier. No other bacterial pathogens were isolated. The asymptomatic child had a negative stool examination. Three parents (including both parents of the index patient), who later developed diarrhea, were positive for *Cryptosporidium*. Parents of children reported mild-to-moderate diarrhea, and most persons required medical care. No one was hospitalized.

Cryptosporidiosis – Continued

New Mexico: During September, investigation of giardiasis in two children led to the discovery of widespread diarrheal disease in two day-care centers in Albuquerque.

Investigation 1: Eighteen (47%) of 38 children attending a day-care center had recently had diarrhea. Stool specimens from 17 symptomatic and one asymptomatic child were examined for parasites. *Cryptosporidium* alone was found in specimens from four symptomatic children. Five children had *Giardia* only; one child was infected with both parasites. Only two of six specimens with *Giardia* were examined for *Cryptosporidium*. Stool specimens were submitted by 11 household members of symptomatic children. Of seven household members reporting recent diarrheal illness, one had *Cryptosporidium*, and two had *Giardia*; one asymptomatic adult had *Giardia*. Children and adults reported mild but sometimes prolonged diarrhea, and no one was hospitalized.

Investigation 2: In this day-care center, diarrheal illness was limited to the classroom for toddler-aged children. Thirteen (81%) of 16 children and one of three adults reported recent diarrhea. Of stool specimens from 13 children examined so far, five have shown *Cryptosporidium* only, and four, *Giardia* only. Two additional children had both parasites. Two of the specimens with *Giardia* were not examined for *Cryptosporidium*.

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Editorial Note: Outbreaks caused by a number of important infectious agents (including *Giardia, Shigella, Haemophilus influenza*, hepatitis A, rotavirus, and respiratory-tract viruses) have been documented in day-care centers (*2*). The investigations reported here suggest that the intestinal parasite *Cryptosporidium* should be added to this list. Although a few children had moderately severe diarrhea, none required hospitalization.

Cryptosporidium is a well-known cause of diarrhea in animals but has been recognized only recently as a cause of human disease. The first case of human cryptosporidiosis was reported in 1976; before 1982, literature exists on only seven human cases of cryptosporidiosis. Since 1982, the number of reported cases increased markedly (*3*). Initially, this increase was noted in patients with acquired immunodeficiency syndrome (AIDS), but recent reports indicate that cryptosporidiosis is common in immunologically normal persons (*4-6*). Patients with AIDS and cryptosporidiosis usually have severe, irreversible diarrhea, but persons with normal immunologic function have self-limited, although at times severe, diarrhea. The spectrum of illness caused by *Cryptosporodium* has yet to be clearly defined, and no satisfactory treatment is currently available.

Public health workers, physicians, parents, and day-care providers need to be alert to cryptospordiosis as a potential cause of outbreaks of diarrhea in day-care centers. Special concentration and staining techniques for the recovery and isolation of *Cryptosporodium* are required (*7,8*), and investigators should notify laboratory personnel that *Cryptosporodium* is considered a possible pathogen in outbreaks. Knowledge of how *Cryptosporidium* is transmitted in the day-care setting is presently lacking, and only general guildelines for the prevention and control of enteric infections are available. Cryptosporidiosis outbreaks in day-care centers should be reported to state and local health departments. CDC would also like to be notified so that the spectrum of illness of this organism in this setting can be further defined.

Cryptosporidiosis — Continued

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Outbreak of Tick-Borne Tularemia — South Dakota

Between May 30, and July 15, 1984, 20 definite and eight probable cases of tularemia were reported among residents of the adjoining Lower Brule and Crow Creek Indian Reservations in central South Dakota. All the patients were native Americans ranging in age from 2 years to 31 years (median 6 years). The attack rate for reservation residents 0-9 years of age was 2%; for those 10-19 years of age, 0.2%; and for those 20 years and older, 0.2%. Sixteen of the patients were male. Twenty-two (79%) of the patients reported a tick bite, and none had contact with rabbits or dead animals or had eaten rabbit meat.

Most patients presented with fever, headache, and adenopathy. All the patients for whom a tick-bite location was known had been bitten on the head or neck. These patients presented with regional adenopathy draining the area of the tick bite. All 28 patients had either cervical, submandibular, occipital, or preauricular adenopathy. Four patients also appeared to have enlarged parotid glands and presented with a clinical picture that resembled mumps. Seven patients had pharyngitis. Eight had a fourfold rise in serum agglutination titer of 1:160 or greater to *Francisella tularensis;* 12 patients had a single convalescent titer of 1:160 or greater; and eight with pending convalescent serology had compatible clinical illnesses. Three lymph-node aspirates did not yield *F. tularensis*. Twenty-six patients were treated with streptomycin; two, with tetracycline. All responded to antimicrobial therapy.

Environmental investigation revealed few ticks on vegetation near the homes, but ticks were found on vegetation around the streams and rivers on the reservation. Forty-six (73%) of the 63 dogs that were examined on the two reservations were infested with ticks. Ticks collected from both vegetation and dogs were identified as *Dermacentor variabilis*. These ticks, as well as three mud and three water samples from areas where children play on the reservation, were cultured for *F. tularensis*. Tick lots from eight (17%) of the 46 dogs were positive. Mud and water samples were negative. Biochemical analysis of the *F. tularensis* isolates revealed that seven were type B, and one was type A.

Most families owned several dogs, and stray dogs were abundant on the reservations. It is likely that tularemia was seen predominately in children because of their increased exposure to ticks through their frequent contact with dogs and outdoor activities in tick-infested areas.

Tick-Borne Tularemia — Continued

Recommended prevention measures included continuing an educational program on tularemia for reservation residents, dusting dogs with tick powder (6% malathion), and cutting grass around the homes to prevent tick harborage.

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Editorial Note: This outbreak is similar to two previously reported tick-borne outbreaks of tularemia in the United States. In 1966, 12 cases occurred on the Pine Ridge and Rosebud Indian Reservations in South Dakota (*1*); in 1979, 12 cases occurred on the Crow Indian Reservation in Montana (*2*). Infection in those two outbreaks also occurred predominately among children, and the presentation was mild glandular or ulceroglandular tularemia. Adenopathy in the head and neck areas, similar to the clinical picture in this outbreak, was also described in those outbreaks. In both prior outbreaks, *D. variabilis* was the tick vector, and *F. tularensis* was isolated from ticks.

Two subtypes of *F. tularensis* have been recognized (*3*). Type A strains, which have been found only in North America, are more virulent and cause illness that, without treatment, has a 5%-7% mortality rate. Type B strains are less virulent. These strains differ biochemically in that type A utilizes glycerol and is citrulline ureidase positive (*4*). In this outbreak, seven of the eight *F. tularensis* isolates from ticks were type B. Although no human isolates were obtained, the mild clinical illness was consistent with disease caused by type B *F. tularensis*. Disease caused by type B strains have been most commonly associated with exposure to contaminated water or aquatic animals, rather than insect vectors. However, type B strains were also isolated from ticks in the 1979 outbreak in Montana (*2*).

Because glandular tularemia can be mild, as in the current outbreak, and can mimic other illnesses such as pharyngitis or mumps, cases may be misdiagnosed. Physicians in areas endemic for tularemia should be aware of the manifestations of glandular tularemia so that cases can be identified and appropriately treated.

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